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Dark Energy: Measurement by the DEEP2 Redshift Survey

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The DEEP2 redshift survey has now covered ~ 2.5 degrees² of sky and obtained nearly 40,000 spectra; the survey is nearly finished, and I shall describe what has been accomplished with all that Keck time! One of our fields is the Extended Groth Strip (EGS), a region where deep imaging is being obtained with Chandra, Spitzer, GALEX, VLA, and HST/ACS and will be the subject of Sunyaev-Zel'dovich observations. We will eventually provide 17,000 redshifts. In three other regions, we have used three-color imaging to efficiently select galaxies with magnitude $R_{AB} < 24.1$ and redshifts in the range $0.7 < z < 1.4$. The EGS pointing does not have the preselection. We describe here one method by which DEEP2 can set constraints on the equation of state parameter of the Dark Energy, w . By counting the number of virialized groups and clusters we find in redshift space as a function of their redshift and internal velocity dispersion, we probe both the volume element and the growth of structure at $z \sim 1$, each of which depends on w . We find 320 groups in the volume, and show how it measures w , but also depends on the bias in the velocity field of galaxies in clusters, b_v . Studies of this effect are underway.